PATENT SPECIFICATION

DRAWINGS ATTACHED

Inventor: ANTHONY DANIEL ADAMSON LEIGH

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COMPLETE SPECIFICATION

Improvements in or relating to Hypodermic Syringes

We, WALL & LEIGH (THERMOPLASTICS) LIMITED, a British Company, of Mill Street, Darlaston, in the County of Staffordshire, do hereby declare this invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to hypodermic syringes of the kind having a barrel and a plunger and in which the head or seal of the plunger is formed integrally with the stem thereof and is primarily concerned with such syringes which are of the disposable type, that is to say, are thrown away after a single use thereof. Such disposable syringes are used, for example, by diabetics, and are supplied, together with the necessary needle in a pre-sterilised pack so that the patient does not have to carry out any sterilisation procedure before performing the injection. Disposable syringes are also used to a large extent in hospitals, because the sterilisation of conventional syringes is expensive and also because there is always a danger that the sterilisation will not be complete.

It is, of course, essential that the cost of such disposable syringes be reduced to a minimum in view of their expendable nature and it is, therefore, the object of the present invention to provide a hypodermic syringe which is both simple and inexpensive to make. Another object of the invention is to provide a syringe which further reduces the possibility of infection while performing the injection.

According to the present invention we provide a hypodermic syringe of the kind referred to in which the barrel is formed at the end at which the plunger is inserted with an internal shoulder so as to divide the barrel into two portions, the portion adjacent said end being of increased internal diameter and the head of the plunger being a loose fit within said portion of increased internal diameter.

Conveniently the inner end of the stem of the plunger is of reduced diameter as compared with the main length of the plunger, the head being formed on the one end of this portion of reduced diameter and the head being in the form of a relatively thin annular flange.

The head of the plunger will, of course, be a seal fit with the inside of the wall of the barrel of the syringe and the diameter of the main part of the stem of the plunger is slightly less than the internal diameter of the barrel in order to provide a working clearance.

It is desirable that the syringe should be supplied in its pre-sterilised pack with the plunger at least partially within the barrel, so that the danger of contamination of the interior of the barrel which would result from assembly of the syringe after unpacking is avoided or reduced. However, if the head of the plunger is a seal fit in the barrel it is possible that while awaiting use the head would be deformed by prolonged contact with the barrel and the syringe would not function properly. In accordance with our invention, therefore, the barrel is provided at the end at which the plunger is inserted with a portion of increased internal diameter in which the head of the plunger is a loose fit.

Conveniently the plunger is of hollow form and may be made of a suitable thermoplastic.

An example of a hypodermic syringe embodying the invention will now be described with reference to the accompanying drawings in which:—

Figure 1 is a perspective view of a syringe

[*Price* 4*s.* 6*d.*]

showing the plunger removed from the barrel.

Figure 2 is a section along the longitudinal axis of the assembled syringe in the direction of the arrows 2—2 of Figure 1 and Figure 3 is a side view of the inner end of the plunger.

The barrel 10 of the syringe is moulded from a suitable transparent material, and is of hollow cylindrical form, a graduated scale 11 indicating the volume of liquid which can be drawn into the barrel being marked on the outer face thereof.

Formed integrally with the one end of the barrel is a flange member 12 which is provided with a pair of diametrically opposed wings or ears 13 whereby the barrel may be held during operation of the syringe.

Formed integrally with or secured to the other end 14 of the barrel is an axially extending centrally disposed stem 15 of reduced diameter which is provided with an axially directed through bore 16 communicating with the interior 17 of the barrel. This portion of reduced diameter is adapted to receive a synthetic plastic cap in the one end of which is secured the needle.

The plunger 18 of the syringe is made from a suitable thermoplastic material and is of hollow cylindrical form, being provided at one end thereof, this end being the outer when the syringe is assembled with an annular flange 19 which serves as a handle when the syringe is being used. The inner end portion 20 of the plunger is of reduced diameter as compared with the main length thereof and has formed integrally therewith on the head thereof an annular flange 21 which constitutes the head or seal of the plunger. This annular flange 21 is of relatively thin section and is of the same diameter as the internal diameter of the barrel so that it forms an effective seal therewith. The end face 22 of this flange is of conical form so as to enable complete emptying of the syringe to be effected, the end wall 23 of the barrel being of similar conic form so that it tapers down to the through bore associated with the reduced diameter stem.

The barrel has a portion 24 of increased internal diameter adjacent its open end. The head 21 of the plunger is a loose fit in this portion and the syringe is packed in its sterilised condition with the head 21 abutting the shoulder 25 formed between the parts of the barrel of different internal diameters.

For a syringe which is of two mls. capacity the internal diameter of the barrel 10 may be 1/4 of an inch, the length thereof being 2 inches. The length of the portion 24 is 3/8 of an inch. The length of the main portion of the plunger would be 2 inches whilst the length of that portion 20 of the plunger which is of reduced diameter is 1/4 of an inch. Thus, when the plunger 18 is fully home in the barrel the handle 19 thereof is spaced away from the wings 13 of the barrel so that the user can readily withdraw the plunger for filling. The flange 21 which forms the head of the plunger would have a minimum thickness of the order of 1/64 inch.

Such a syringe is of extremely simple and thus economical construction and the provision of the thin head ensures effective sealing contact between the plunger and the barrel so as to avoid any possibility of air being drawn into the barrel during the filling operation and also so as to ensure that a full measure is delivered by the syringe.

By providing a head or seal integral with the main portion of the plunger the danger of any cross infection is reduced as compared with such disposable syringes as have heretofore been used where the head of the plunger is formed of rubber, the head being secured to the plunger by hand during the assembly of the syringe.

WHAT WE CLAIM IS:—

1. A hypodermic syringe of the kind referred to in which the barrel is formed at the end which the plunger is inserted with an internal shoulder so as to divide the barrel into two portions, the portion adjacent said end being of increased internal diameter and the head of the plunger being a loose fit within said portion of increased internal diameter.

2. A hypodermic syringe according to Claim 1, wherein the inner end of the stem of the plunger is of reduced diameter as compared with the main length of the plunger, the head being formed on the one end of this portion of reduced diameter and the head being in the form of a relatively thin annular flange.

3. A hypodermic syringe according to either Claim 1 or 2 wherein the plunger is of hollow form.

4. A hypodermic syringe according to any of the preceding claims made of a suitable thermoplastic material.

5. A hypodermic syringe substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

FORRESTER, KETLEY & CO.,
Chartered Patent Agents,
Central House, 75, New Street,
Birmingham, 2, and
Jessel Chambers, 88/90, Chancery Lane,
London, W.C.2.

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1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

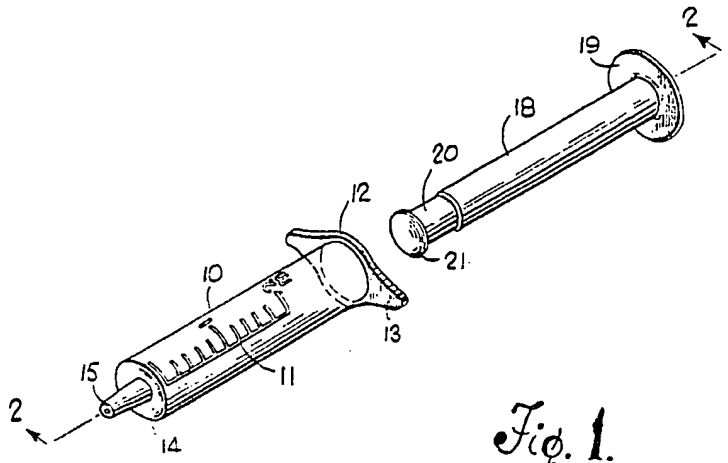

Fig. 1.

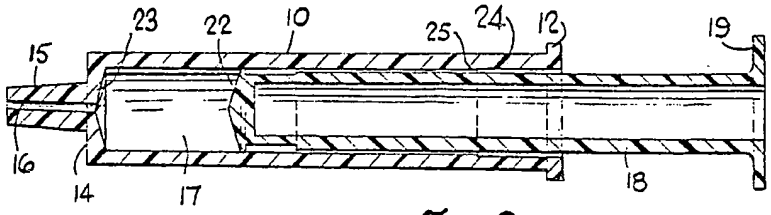

Fig. 2.

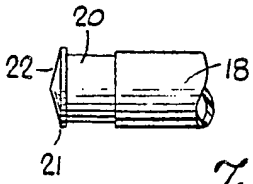

Fig. 3.